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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,931	06/20/2001	Yang Chen	HRL054	1774

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EXAMINER

LU, TOM Y

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/886,931

Applicant(s)

CHEN, YANG

Examiner

Tom Y Lu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsutsumi et al (U.S. Patent No. 5,617,085).

- a. Referring to Claim 1, Tsutsumi discloses a host vehicle; wherein said host vehicle (a vehicle at column 6, line 42 is the claimed “host vehicle”) is equipped with a plurality of elements including: an image capture device element (a camera mounted on a vehicle is the claimed “image capture device”, which is further described at column 7, line 29 as a CCD camera 3); operative interconnected with; an image signal processor element (lane detecting means 51, column 7, line 39 is the claimed “image signal processor” processes the images obtained from the CCD camera 3); which is operatively interconnected with; a matching processor element (the forward vehicle detecting means 53 is the claimed “matching processor”); which is operatively interconnected with; a radar transceiver element (laser radar 4, column 7, line 35); wherein the image capture device is configured to provide a time based sequence of data frames to the image signal processor (CCD camera 3 is a video camera, which captures a time based sequence of data frames) and the image signal processor provides a processed

image signal to the matching processor (see figure 2, lane detecting means 51 inputs processed image signal to forward vehicle detecting means 53), and wherein the data frames include a two dimensional array of pixel elements (a frame includes a two dimensional array of pixels, which is a inherent characteristic); and wherein the radar transceiver is configured to provide a radar signal to the matching processor (laser radar 4 provides position information, column 7, line 45), and wherein the matching processor combines the processed image signal and the radar signal (see figure 2, both lane detecting means 51 and coordinate transforming means 52 input signal data into forward vehicle detecting means), whereby the combined signals complement each other and allow the apparatus to effectively identify objects likely to be misidentified (column 9, lines 46-52).

- b. Referring to Claim 2, Tsutsumi discloses wherein the image capture device is a video camera responsive to electromagnetic radiation substantially in at least one of the regions selected from the group consisting of the visible region, and the infrared region (column 4, lines 34-38).
- c. Referring to Claim 3, Tsutsumi discloses wherein the time based sequence of data frames (Tsutsumi teaches the CCD camera records image frames for a period of time, column 16, line 5) include a plurality of data element including at least one horizontal edge (see horizontal edge in figure 12a, the outline of the car); and wherein each horizontal edge is identified based on a plurality of pixels having a substantially similar electromagnetic radiation response across a plurality of

substantially horizontally aligned pixels (column 14, lines 50-52); and wherein the image signal processor extracts horizontal edges, from the time based sequence of data frames, in the form of edge pixels (the edge of the car is extract as shown in figure 12a); and wherein the edge pixels are projected in each row of the data frames, to get a horizontal edge projection in the sequence of data frames (the histogram shown in figure 12a is the claimed “horizontal edge projection”); and wherein each horizontal edge projection may be tracked in time based on the horizontal edge projection’s sequential appearance in the data frame (the histogram of the vehicle shown in figure 12a is tracked by comparing the outputs from the histogram computing means 563 and the comparative reference value setting means 564, column 15, lines 65-67).

- d. Referring to Claim 4, Tsutsumi discloses wherein horizontal edge projections may be tracked in time by recording sequential data frames and matching horizontal edge projections in the sequential data frames while allowing, in the sequential data frames, for minor variation from, in at least one of the following categories: the relative position of the horizontal edge projection in the frame; the relative orientation of the horizontal edge projection in the frame (Tsutsumi teaches the minor variation from the relative position of the horizontal edge projection in the frame, column 15, lines 52-64. Note the claim only requires one of the categories to be satisfied herein, and the first category is explained in Tsutsumi); and the relative length of the horizontal edge projection; and wherein at least one new

tracking sequence can exist for horizontal edge projections that have predefined characteristics but where not present in prior data frame.

- e. Referring to Claim 5, Tsutsumi teaches wherein horizontal edge projection tracks are sorted based on the duration of image inputs that the horizontal edge projection track records.
- f. Referring to Claim 6, Tsutsumi teaches wherein the horizontal edge projection tracks are compared with predetermined parameters to determine if tracking possibilities exist; if tracking possibilities exist then the vision-based identification apparatus is utilized to track substantially horizontal edges through successive image inputs (Tsutsumi teaches the output of the histogram computing means 563 is compared with the comparative reference value setting means to determine whether or not the forward vehicle is within the window 201, and comparative reference value 204 is the claimed “predetermined parameter”, and the tracking is performed over a prescribed period of time, column 15, lines 65-67, and column 16, lines 1-5).
- g. Referring to Claim 7, Tsutsumi discloses wherein the predetermined parameters include at least one of the following: the number of successive image inputs having horizontal edge projection tracks, and the magnitude of the horizontal edge projection tracks (the comparative reference value as shown in figure 12a contains at least magnitude of the horizontal edge projection tracks).
- h. Referring to Claim 8, Tsutsumi teaches wherein if no tracking possibilities exist, tracking may still occur for a pre-specified number of image inputs without

tracking possibilities before the tracked horizontal edge projection track is discarded (it is an inherent feature in any tracking system that if there is no tracking possibilities exist, the system would still track for at least one image frame before terminating tracking).

- i. Referring to Claim 9, Tsutsumi discloses wherein tracking of horizontal edge projection vectors is assisted by using at least one of the followings: vertical motion compensation; forward motion compensation; wherein vertical motion compensation helps predict where tracked horizontal edge projection vectors will be located on successive image inputs by compensating for vertical motion, and wherein the forward motion compensation helps predict where tracked horizontal edge projection vectors will be located on successive image inputs by compensative for forward motion (Tsutsumi teaches forward motion compensation at column 15, lines 52-64, where the representative point P is used to help predict where tracked horizontal edge projection vectors will be located. Note claims 11-13, which are directed to non-elected vertical motion compensation, are not examined).
- j. Referring to Claim 10, Tsutsumi teaches wherein forward motion compensation is achieved by using at least two previous points from the image input on the tracked horizontal edge projection tracks, immediately before the image input that requires forward motion compensation for tracked horizontal edge projection vectors location prediction (as described at column 15, lines 52-64, the representative point P that helps predict where the horizontal edge projection

vectors will be located, is derived from plural detected points detected by the laser radar 4, column 14, line 61-62).

- k. With regard to Claim 11, see explanation in Claim 9.
- l. With regard to Claim 12, see explanation in Claim 9.
- m. With regard to Claim 13, see explanation in Claim 9.
- n. Referring to Claim 14, Tsutsumi discloses wherein the signal input from the image capture device to the image signal processor is a single horizontally centered window of the image signal input from the image capture device (see figure 12a for window 201).
- o. Referring to Claim 15, Tsutsumi discloses wherein the single horizontally centered window is set at a predetermined width and a predetermined height and wherein the single horizontally centered window can be adjusted either left or right based on steering wheel position or lane information (Tsutsumi at column 15, lines 19-30, teaches the window setting means sets window 201 according to the coordinate of representative point P, which is adjusted according to the steering wheel position or lane information).
- p. Referring to Claim 16, Tsutsumi discloses wherein successive horizontal edge projection tracks have a length in excess of a predetermined length.
- q. With regard to Claim 17, see explanation in Claim 8.
- r. With regard to Claim 18, all limitations are addressed in Claim 1.
- s. With regard to Claim 19, all limitations are addressed in Claim 2.
- t. With regard to Claim 20, all limitations are addressed in Claim 3.



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- u. With regard to Claim 21, all limitations are addressed in Claim 4.
- v. With regard to Claim 22, all limitations are addressed in Claim 5.
- w. With regard to Claim 23, all limitations are addressed in Claim 6.
- x. With regard to Claim 24, all limitations are addressed in Claim 7.
- y. With regard to Claim 25, all limitations are addressed in Claim 8.
- z. With regard to Claim 26, all limitations are addressed in Claim 9.
- aa. With regard to Claim 27, see explanation in Claim 10.
- bb. With regard to Claim 28, see explanation in Claim 11.
- cc. With regard to Claim 29, see explanation in Claim 12.
- dd. With regard to Claim 30, see explanation in Claim 13.
- ee. With regard to Claim 31, all limitations are addressed in Claim 14.
- ff. With regard to Claim 32, all limitations are addressed in Claim 15.
- gg. With regard to Claim 33, all limitations are addressed in Claim 16.
- hh. With regard to Claim 34, all limitations are addressed in Claim 17.

### ***Conclusion***

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
  - a. Kilger et al, U.S. Patent No. 5,592,567, see column 4, lines 51-60, and see figure 8.
  - b. Nishigaki et al, U.S. Patent No. 6,731,777 B1, see figure 7.
  - c. Yoshioka et al, U.S. Patent No. 6,035,053, see columns 4-6.

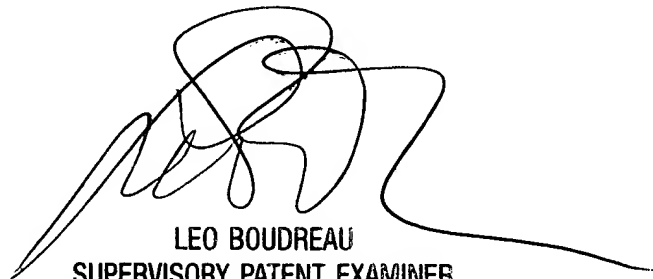
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3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Y Lu whose telephone number is (703) 306-4057. The examiner can normally be reached on 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Y. Lu



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